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Art Unit 1764

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### REMARKS

This Amendment is respectfully submitted to place rejected claims of subject Application in condition for allowance. The claims have been amended to more clearly point out the patentable subject matter of Applicants novel invention.

In particular, Claim 1 has been amended to recite the two critical steps of Applicants' novel process, which are:

Contacting the feedstock with an oxygen-containing gas in an oxidation zone at oxidation conditions in the presence of an oxidation catalyst comprising at least one active Group VIII metal selected from the group consisting of the *d*-transition elements in the Periodic Table having atomic number from 21 to 30 inclusive, and a basic support selected from the group consisting of alkali oxides and alkaline earth oxides to convert the sulfur and nitrogen-containing organic impurities to oxidized sulfur and nitrogen-containing compounds; and

Separating a portion of the oxidized sulfur and/or nitrogen-containing compounds from the oxidation zone effluent as by distillation to recover a distillate effluent having a reduced amount of the oxidized sulfur and/or nitrogen-containing compounds and a TAN number of less than about 2.0 mg KOH/g.

Support for amended Claim 1 is found in the Specification, for example at page 11, lines 20 to 21, page 17, lines 2 and 3, and lines 17 to 20, and canceled Claim 6.

Claims 3 to 8, inclusive have been canceled without prejudice. Claim 2 has been amended to recite the limitations of now canceled Claims 3 and 4. Claim 11 has been amended to depend from original Claim 9, and Claim 12 has been amended to depend from amended Claim 11,

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Claim Rejections - 35 U.S.C. § 103(a)

In outstanding Office Action, Claims 1, 6, 11, and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Marcilly et al. (USP 5,591,323). Applicants respectfully traverse these rejections.

5       The Marcilly et al. reference of record describes a treatment of a petroleum cut containing mercaptans using porous catalyst wherein the basic matrix is obtained by incorporating an alkaline ion (sodium ion, potassium ion) into a mixed oxide structure which is essentially constituted of aluminum oxides and silicon oxides combined. (first  
10 paragraph under Summary of the Invention). The aluminosilicates are said to be closely linked to the active carbon and to a metal chelate thereby showing optimum sweetening catalytic performances when the hydrated level of the catalyst in between 0.1 and 40%. Prolonged use may require water or aqueous alkaline solution to be added to the porous catalyst bed  
15 at regular intervals. The metal chelate used as a catalyst is in the form of a phthalocyanine, such as cobalt phthalocyanine. At temperatures above 70 degrees C, (158 degrees F) the stability of the catalyst with a metal chelate base is rapidly reduced, causing degradation in the efficiency of the transformation of the mercaptans into disulphides.

20       Attention of Examiner is invited to Example 2 at pages 21-22 in the Specification which demonstrated the efficacy of Applicants' novel invention to reduce nitrogen content in addition to non-mercaptans sulfur content when carried out at temperatures well above 158 degrees F, i.e. at 310 and 265 degrees F. Acid-washed oxidized diesel nitrogen was 5 ppm-  
25 w and sulfur was 2-3 ppm-w.

      The sweetening process in fixed bed of Marcilly et al. is said to transform mercaptans into disulphides (which may be separated by transfer into an aqueous medium) using a metal phthalocyanine catalyst that  
30       degrades at temperatures above 158 degrees F does not suggest even the first critical step of Applicants' novel process using a catalyst system that

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is robust at temperatures above 200 degrees F and even to over 300 degrees F.

It is the position of Applicants that the Marcilly et al. reference of record does not suggest the essence of their novel multi-step process as  
5 recited according to instant Claims 1, 2 and 9 to 12.

Claims 2 to 5 and 7 to 10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Marcilly et al. (USP 5,591,323) as applied to claim 1 above, and further in view of Arena et al. (USP 5,286,372). Applicants respectfully traverse these rejections.

10 The Arena et al. reference of record also describes a treatment of a petroleum cut containing mercaptans using an effective amount of a polar compound and a metal phthalocyanine based catalyst to transform the mercaptans into disulphides. The metal phthalocyanine is dispersed on a support consisting of a solid solution of metal oxides, e.g., a magnesium  
15 oxide and aluminum oxide solid solution ( $\text{MgO} \cdot \text{AlO}_3$ ), a layered double hydroxide and mixtures thereof. By contrast, the later granted Marcilly et al. patent describes a process that uses a metal phthalocyanine based catalyst on a support including 1 to 60 percent by weight active carbon, aluminosilicates with a Si/Al atomic ratio less than or equal to 5, where  
20 the aluminosilicates is to be closely linked to the active carbon and to a metal chelate

A combination of these two references of record, both directed to conversion mercaptans into disulphides using a non-thermally stable metal phthalocyanine based catalyst, does not suggest the essence of Applicants'  
25 novel multi-step process as recited according to instant Claims 1, 2 and 9 to 12.

Attention of Examiner is invited to Example 1 at pages 18-21 in the Specification which demonstrated the efficacy of Applicants' novel invention to reduce nitrogen content in addition to non-mercaptans sulfur  
30 content when carried out at temperatures well above 158 degrees F, i.e. at

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310 degrees F. As reported in Table II, the process of the present invention achieved a shift in sulfur species to heavier sulfur species, in particular thiophenes and benzothiophenes to dibenzothiophenes, which would result in a desulfurization of about 90 percent achieving sulfur  
5 levels after the subsequent distillation step to below about 5 ppm.

It is important to recall that thiophenes are a series of organic compounds having a five-member ring that contains a sulfur bonded to adjacent ring carbons, i.e. not bonded to hydrogen. By contrast, mercaptans are derivatives of hydrogen sulfide in the same way that  
10 alcohols are derivatives of water, i.e. the oxygen in H<sub>2</sub>O is replaced by sulfur. For example, methyl mercaptan (methanethiol) is represented by the formula (CH<sub>3</sub>)—SH. Applicants believe that processes described by the references of record for removing mercaptans from petroleum cuts cannot be read to apply to conversions of thiophenes in a process for  
15 reducing the sulfur and nitrogen content of a distillate feedstock.

It is the position of Applicants that combination of the Marcilly et al. and Arena et al. references of record does not disclose or suggest their novel multi-step process as recited according to instant Claims 1, 2 and 9 to 12.

20 Claim Rejections under Nonstatutory Double Patenting:

In outstanding Office Action, Claims 1 to 12 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 to 12 of copending Appellation Number 10/718,946. Applicants respectfully traverse these  
25 rejections.

Filed herewith is a timely terminal disclaimer in compliance with 37 CFR 1.321(c) which terminal disclaimer overcomes the outstanding provisionally rejection of Claims 1 to 12 based on nonstatutory double patenting ground in view of claims 1 to 12 of commonly owned  
30 copending Appellation Number 10/718,946.

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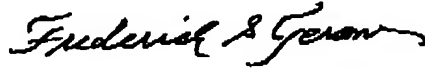
Base on the amendments submitted herein, Applicants urge that Claims 1, 2 and 9 to 12, inclusive, all claims now presented, are in condition for allowance. Applicants respectfully request Primary Examiner Griffin to pass subject application for allowance.

- 5 Do not hesitate to contact Frederick S. Jerome whose telephone number is (630) 832-7974 (FAX (630) 832-7976) if additional assistance is needed regarding this paper or earlier papers for Applicants.

Applicants and their undersigned Attorney appreciate Examiner's attention and further consideration of this matter.

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Respectfully submitted,



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Primary Examiner Griffin:

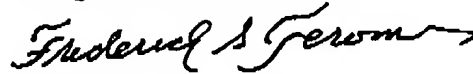
The outstanding Office Action in the above-identified application was mailed March 23, 2006, with a shortened statutory period for response of three (3) months, set to expire June 23, 2006.

- 5 Applicants respectfully petition for a TWO (2) month extension of time period for response to the Patent and Trademark Office Action.

The required fee of \$450.00 is being paid with Form PTO-2038 (Credit Card Payment Form).

- 10 Please charge any additional fee which may be required, or credit any overpayment, to Deposit Account No. 01-0528.

Respectfully submitted,



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